MISSION SUPPORT

FISCAL YEAR 2000 ESTIMATES

BUDGET SUMMARY

OFFICE OF SPACE FLIGHT **SPACE COMMUNICATIONS SERVICES**

SUMMARY OF RESOURCES REQUIREMENTS

	FY 1998 OPLAN 9/29/98	FY 1999 OPLAN 12/22/98	FY 2000 PRES BUDGET	Page Number
		(Thousands of Dollars)		
Space Network	111,700	110,300	37,800	MS 2-4
NASA Integrated Services Network	82,500	75,500	51,900	MS 2-9
[Reimbursements [non-add]]	[51,000]	[45,900]	[45,900]	
Total	194,200	185,800	89,700	
Distribution of Program Amount by Installation				
Johnson Space Center	200	2,300	--	
Marshall Space Flight Center	72,600	69,100	46,500	
Glenn Research Center	52,000	--	--	
Goddard Space Flight Center	63,300	71,400	24,800	
Jet Propulsion Laboratory	5,600	5,200	4,200	
Headquarters	500	3,000	700	
Total	194,200	185,800	89,700	

PROGRAM GOALS

The Space Communications goal is to provide high quality, reliable, and cost-effective space operations services which enable Enterprise mission execution. Reliable electronic communications are essential to the success of every NASA flight mission, from planetary spacecraft to the Space Transportation System (STS) to aeronautical flight tests.

The Space Operations Management Office (SOMO), located at the Johnson Space Center in Houston, manages the telecommunications, data processing, mission operation, and mission planning services needed to ensure the goals of NASA's exploration, science, and research and development programs are met in an integrated and cost-effective manner. In line with the National Space Policy, the SOMO is committed to seeking and encouraging commercialization of NASA operations services and to participate with NASA's strategic enterprises in collaborative interagency, international, and commercial initiatives. As NASA's agent for operational communications and associated information handling services, the SOMO seeks opportunities for using technology in pursuit of more cost-effective solutions, highly optimized designs of mission systems, and advancement of NASA's and the nation's best technological and commercial interests.

The Space Communication Services segment of NASA's Space Communications program is composed of two major elements. The Space Network element provides communications support to human space flight missions and low-Earth orbital spacecraft compatible with the Tracking and Data Relay Satellite (TDRS) system and to expendable launch vehicles and research aircraft. The NASA Integrated Services Network (NISN) program element provides telecommunications interconnectivity among NASA flight support networks, project and mission control centers, data processing centers and facilities, contractor facilities, and investigator science facilities located throughout the nation and the world.

STRATEGY FOR ACHIEVING GOALS

The Space Communications program provides command, tracking and telemetry data services between the ground facilities and flight mission vehicles. The program also supports all the interconnecting telecommunications services to link tracking and data acquisition network facilities mission control facilities, data capture and processing facilities, industry and university research and laboratory facilities, and the investigating scientists. The program provides integrated solutions to operational communications and information management needs common to all NASA strategic enterprises as well as NASA-wide telecommunications network services to support all of NASA's administrative communications needs.

The range of telecommunications systems and services are provided to conduct mission operations, enable tracking, telemetry, and command of spacecraft and sub-orbital aeronautical and balloon research flights. Additionally, services and systems are provided to facilitate data capture, data processing, and data delivery for scientific analysis. The program also provides the high-speed computer networking, voice and video conferencing, fax, and other electronic mail services necessary to administer NASA programs.

These communications functions are provided through the use of space and ground-based antennas and network systems, mission control facilities, computational facilities, command management systems, data capture and telemetry processing systems, and a myriad of leased interconnecting communications systems ranging from phone lines and satellite links to optical fibers.

The program provides the necessary research and development to adapt emerging technologies to NASA communications needs. New coding and modulation techniques, antenna and transponder development, and automation applications are explored and, based on merit, demonstrated for application to future communications needs. The program also provides scheduling, network

management and engineering, pre-flight communications test and verification, as well as flight system maneuver planning and analysis for selected missions. NASA's flight programs are supported through the study and coordination of data standards and communication frequencies to be used in the future. These are all parts of the strategic approach to providing the vital communications systems and services common to all NASA programs and to achieve compatibility with future commercial satellite systems an services.

Many science and exploration goals require inter-agency or international cooperation in order to be achieved. NASA Space Communications assets are provided thorough collaborative agreements to other U.S. Government agencies, commercial space enterprises, and international cooperative programs. Consistent with the National Space Policy, NASA will purchase commercially available goods and services to the fullest extent feasible, and will not conduct activities with commercial application that preclude or deter commercial space activities.

The modernization of the original White Sands Ground Terminal, along with the Second TDRSS Ground Terminal (STGT), provided fail-safe operations of the Space Network and its TDRS spacecraft. Initial planning and design of a remote ground terminal capability at Guam, extending the White Sands Ground Terminal capability by providing for coverage of the Zone of Exclusion, was completed in FY 1996. Development of the system was completed in FY 1998. The Space Network provides communications for the Space Transportation System, the Hubble Space Telescope (HST) astronomical observatory and many other NASA missions, as well as non-NASA users on a reimbursable basis. The development of the Replenishment Tracking and Data Relay Satellites is on-going. The Telecommunications program consolidated all NASA wide-area network systems in FY 1997, providing integrated services for operational and administrative communication needs at reduced costs.

Efforts are continuing to consolidate and streamline major support contract services. In FY1996, a plan to transition to a consolidated space operations contract began and has been implemented in two distinct phases. In FY 1997, two short-term, fixed-price study contracts were awarded to develop an Integrated Operations Architecture (IOA) approach to consolidate space operations activities across the Agency. On October 1, 1998, a Consolidated Space Operations Contract (CSOC) was competitively awarded to the Lockheed-Martin Space Operations Company. This contract is a 10-year, cost-plus-award-fee (CPAF) and became operational on January 1, 1999. This consolidated, integrated approach to the Space Communications program is expected to maximize space operations resources by reducing systems overlap and duplication. Significant efficiencies and economies are expected over the life of the CSOC contract. Additional efforts will be undertaken to consider other opportunities for accelerating the National Space Policy directive that NASA privatize or commercialize its space communication operations no later than 2005.

BASIS OF FY 2000 FUNDING REQUIREMENT

SPACE NETWORK

	FY 1998	FY 1999	FY 2000
		(Thousands of Dollars)	
Space Network Services	3,700	8,800	6,600
TDRS Replenishment Spacecraft	56,000	66,700	17,700
TDRS Replenishment - Launch Services	52,000	34,800	13,500
Total	111,700	110,300	37,800

PROGRAM GOALS

The Space Network program goal is to provide reliable, cost-effective space-based tracking, command and data acquisition telecommunications services to the Human space Flight program, other low-Earth-orbital science missions including observatory-class flights, and selected sub-orbital flight missions. The Space Network program provides for the implementation, maintenance, and operation of the communications systems and facilities necessary to ensure and sustain the high-quality performance of NASA flight operations systems. Replenishment Tracking and Data Relay Satellites (TDRS) and the launch systems required to deploy them are also included in this program.

The Space Network participates in collaborative interagency and international programs, and independently provides communications services to other national and commercial endeavors on a reimbursable basis.

STRATEGY FOR ACHIEVING GOALS

NASA's Space Network is comprised of a constellation of geosynchronous TDRS and associated dual ground terminals located in White Sands, New Mexico. The current TDRS constellation consists of three fully operational satellites in service (TDRS-4, 5, & 7), one fully functional satellite stored on-orbit (TDRS-6), and two partially functional spacecraft (TDRS-1 & 3). TDRS-3 is positioned over the Indian Ocean, in conjunction with a remote terminal in Guam, to increase data return from the Compton Gamma Ray Observatory (CGRO) and support Shuttle/MIR operations. TDRS-1, now in its fifteenth year, is still providing service to expendable vehicle launches and other peak loads in the eastern network node.

The Goddard Space Flight Center manages the Space Network program, including the TDRS Replenishment Spacecraft program, and the modification and/or system replacement of the ground facilities and equipment as necessary to sustain network operations for current and future missions. The Replenishment Spacecraft program providing three TDRS spacecraft under a fixed-price, commercial practices contract. The prime contract was awarded to the Hughes Space and Communications Company

in 1995 and the spacecraft development has met program expectations. The first spacecraft's launch readiness is scheduled for the third quarter of CY 1999. The program provides for spacecraft compatibility modifications to the New Mexico ground terminals. Lockheed Martin Corporation is the prime contractor for launch services for the TDRS Replenishment Spacecraft.

The Lockheed Martin Space Operations Company was recently awarded the Consolidated Space Operations Contract (CSOC) on October 1, 1998, and will be the primary support service contractor responsible for systems engineering, software development and maintenance, operations, and analytical services beginning in January 1999.

The Space Network provides communication services at data rates up to 300 megabits-per-second (MBPS) using its Ku-band single-access services, data rates of up to three MBPS using its S-band, single-access services, and a low-rate service of up to 150 kilobits-per-second (KBPS) through its multiple-access service. These services provide unparalleled, flexible high-data-rate communications capabilities for flight operations of low-Earth-orbital missions. Customer satellites are provided with command, tracking, and telemetry services via the TDRS spacecraft, which act as relays for commands from and science telemetry return to the ground terminals. The ground terminals are interconnected with flight control, data capture and processing facilities responsible for mission operations.

Communications services are provided to non-NASA customers on a reimbursable basis. A large share of the Space Network Services program that provides for the operations and maintenance of the ground terminal complex is funded with the receipts from reimbursable services. This reimbursable revenue is anticipated to continue and has been taken into account in formulating the NASA FY 2000 budget request.

Space Network services provides the primary communications for orbital operations of the Space Transportation System and its attached payloads. Services are also provided to automated Earth-orbital missions which have communications systems compatible with the TDRS, and can provide nearly continuous high-data-rate services. The Space Network will provide communications services for the International Space Station (ISS) beginning in FY 1999. Services will also be provided on an agreed-to basis to NASA's International partners. Agreements are in place with Japan, the European Space Agency, and Canada. Negotiations are continuing with the Russian Space Agency as a participant for potential cooperative endeavors in telecommunications.

In addition to the day-to-day operations of the Space Network satellites and ground terminals, the program provides for the replenishment of the satellite assets.

SCHEDULE AND OUTPUTS

	FY 1998		FY 1999		FY 2000
	Plan	Actual	Plan	Current	Plan
Number of hours of network service (thousands)	60,000	44,300	78,000	54,100	62,000
Number of Space Shuttle Luanches supported	6	4	8	7	8

Number of NASA.Other ELV Launches supported	23	23	20	20	25

The projected output of network services remained relatively level through FY 1998. The initiation of the ISS assembly, and the launch of Earth Observation System (EOS) AM-1 and Landsat-7 will necessitate an increased level of communication services in FY 1999. In FY 2000, full-up support to the ISS will necessitate further increases in the level of communication services.

TDRS Replenishment Spacecraft

Start Integration and Test for TDRS-I Plan: April 1998 Actual: May 1998	Start of spacecraft assembly, as well as electrical, environmental, and performance testing. The process begins with spacecraft-level assembly and test. The start of TDRS I integration and test process was delayed due to efforts expended on additional TDRS H development activities. There is no impact on the TDRS I flight readiness dates.
Start Integration and Test for TDRS-J Plan: June 1998 Actual: September 1998	Start of spacecraft assembly, as well as electrical, environmental, and performance testing. The process begins with spacecraft-level assembly and test. The start of TDRS J integration and test process was delayed due to efforts expended on additional TDRS H development activities. There is no impact on the TDRS J flight readiness dates.
Pre-Environmental Review for TDRS-H Plan: July 1998 Actual: November 1998	Verification that the spacecraft is ready for system level environmental testing. Pre-environmental reviews were rephased due to a number of unit level problems on TDRS H, the uniqueness of the TDRS-H payload, and the first-time use of electronic ground test software on TDRS H.
Pre-Environmental Review for TDRS-I Plan: October 1998 Revised: March 1999	Verification that the spacecraft is ready for system level environmental testing. Pre-environmental reviews were rephased due to a number of unit level problems on TDRS H, the uniqueness of the TDRS-H payload, and the first-time use of electronic ground test software on TDRS H.
Pre-Environmental Review for TDRS-J Plan: February 1999 Revised: May 1999	Verification that the spacecraft is ready for system level environmental testing. Pre-environmental reviews were rephased due to a number of unit level problems on TDRS H, the uniqueness of the TDRS-H payload, and the first-time use of electronic ground test software on TDRS H.
Complete Integration and Test - TDRS-H Plan: January 1999 Revised: April 1999	Completion of spacecraft performance and environmental tests allows final assembly and re-testing to begin prior to shipment for launch.
Complete Integration and Test – TDRS-I Plan: May 1999	Completion of spacecraft performance and environmental tests allows final assembly and re-testing to begin prior to shipment for launch.

Revised: June 1999	
Complete Integration and Test – TDRS-J Plan: September 1999 Revised: August 1999	Completion of spacecraft performance and environmental tests allows final assembly and re-testing to begin prior to shipment for launch.
Launch TDRS-H Plan: 4rd Qtr FY 1999	Launch within four years of contract award will be performed, ensuring the continuity of TDRSS services to user space flight systems. Launch of TDRS-I and TDRS-J is now scheduled for 2002 and 2003.

CONSOLIDATED SPACE OPERATIONS CONTRACT (CSOC)

Phase 1 Contract Award	May 1997
Phase 2 Proposal due	January 1998
Phase 2 Contract Award	October 1998
Phase 2 Phase-In	October-December 1998
Phase 2 CSOC In Force	January 1999

ACCOMPLISHMENTS AND PLANS

The Space Network is required to operate 24 hours per day, 7 days per week, providing data relay services to many flight missions. In FY 1998, the missions supported included four Space Shuttle flights and their attached payloads, observatory-class spacecraft in low-Earth orbit such as Hubble Space Telescope (HST) and the Compton Gamma Ray Observatory(CGRO), as well as other compatible missions such as Ocean Topography Experiment, Extreme Ultraviolet Explorer (EUVE), Department of Defense customers, the Rossi X-ray Timing Explorer (RXTE), the Starlink research aircraft, Engineering Test Satellite(ETS-VII), Tropical Rainfall Measurement Mission(TRMM), and the Long Duration Balloon program. The Space Network extended service (on a reimbursable basis) to the expendable launch vehicle community including agreements with US Air Force Titan and Lockheed Martin's commercial Atlas programs.

In FY 1999, the Space Network will continue to provide services to the Space Shuttle Flights and their attached payloads as well as the construction phase of the International Space Station, LANDSAT-7, and the Earth Observing System AM-1 mission.

Efforts began on the establishment of a more robust remote terminal capable of full service provision to users in the TDRS zone of exclusion. The implementation of a full service remote terminal on Guam began with the approved FY 1995 Operating Plan reprogramming action late in FY 1996. The Guam Remote Ground Terminal (GRGT) development was implemented with site development at a U.S. Navy location in Guam. The GRGT extends the capability of the White Sands Ground Terminals to provide full service coverage in the former Zone of Exclusion. This terminal became operational in mid-FY 1998 and replaced the less capable terminal located in Australia. This remote terminal has already proven invaluable in boosting the scientific return from the Compton Gamma Ray Observatory.

Preliminary engineering studies were initiated to add Demand Access capability that would allow customers to directly obtain services from the Space Network without scheduling. Demand access will be installed at White Sands and available for customer use in mid-FY 1999.

During FY 1998, development activities for the TDRS Replenishment Spacecraft continued to progress, with spacecraft manufacturing continuing and integration and test beginning. Modifications to the White Sands Complex ground support continued. Integration activities associated with TDRS-I and J were initiated. The TDRS-I and J Atlas IIA launch services options were exercised on July 1, 1998. In FY 1999, integration activities associated with TDRS-H will be completed and the spacecraft will be launched in late FY 1999. TDRS-I and J spacecraft manufacturing, integration, and testing activities will continue. Modifications and testing of TDRS-H, I, J ground systems will be completed at the White Sands Complex in preparation for TDRS-H on-orbit support. In FY 2000, on-orbit testing and acceptance of the TDRS-H spacecraft will be completed. Modifications to the ground terminal will undergo final acceptance. The TDRS-I and J spacecraft will have completed integration and testing activities and will be available for launch.

BASIS OF FY 2000 FUNDING REQUIREMENT

NASA INTEGRATED SERVICES NETWORK (NISN)

	FY 1998	FY 1999	FY 2000
		(Thousands of Dollars)	
NASA Integrated Services Network.....	82,500	75,500	51,900

PROGRAM GOALS

The NASA Integrated Services Network (NISN) goal is to provide high-quality, reliable, cost-effective telecommunications systems and services for mission control, science data handling, and program administration for NASA programs. The NISN program provides for the implementation, maintenance, and operation of the telecommunications services, control centers, switching systems, and other equipment necessary to provide an integrated approach to NASA communication requirements.

The NISN supports NASA's programs in collaborative interagency, international, and commercial enterprises. Many collaborative arrangements are performed on a reimbursable basis.

STRATEGY FOR ACHIEVING GOALS

NISN is a nationwide system of leased voice, video, and data services; leased wide-band terrestrial and satellite circuits; and control centers, switching centers, network equipment and other communications devices. International telecommunications links are also provided to NASA's Deep Space Network (DSN) sites in Australia and Spain; Spaceflight Tracking and Data Network (STDN) sites outside the Continental U.S.; and common telecommunications exchange points that provide interconnectivity to NASA international partners. Administrative, scientific, and mission control exchanges among NASA and its industrial and scientific partners are supported by NISN networks and systems. Support and participation by other U.S. agencies, universities, and research centers, and by other space-faring nations, are also facilitated, including the provision of secure circuits, systems, and facilities. Domestic Telecommunications circuits are primarily leased by NASA under the FTS-2000 contract managed by the General Services Administration; international circuits are leased under separate contractual arrangements. NISN maintains cooperative networking agreements for exchanging services with the European Space Agency (ESA), Canada, Japan, France, and Russia. The Computer Science Corporation and AlliedSignal Technical Services Corporation provide engineering and operations support for the NISN.

The NISN is managed by the NISN Project Office at the Marshall Space Flight Center in partnership with the Goddard Space Flight Center. NISN provides unique mission and mission support telecommunications services to all NASA Centers supporting contractor locations, international partners, research institutes, and universities. NASA also provides telecommunications services to non-NASA customers on a reimbursable basis.

Command, telemetry, and voice systems communications are provided between spacecraft mission control facilities, tracking and data acquisition networks, launch sites, NASA data processing centers, and scientific investigators whose support is critical to mission control and command. NISN support NASA aeronautical test sites, as well as preflight verification of NASA spacecraft systems and their interconnectivity with NASA communications systems.

The NISN interconnects NASA installations and national and international aerospace contractors, laboratories, scientific investigators, educational institutions, and other Government installations in support of administrative, science data exchange, and other research and analysis activities. Specific mission support services provided by the NISN are voice and video teleconferencing, broadcast television, computer networking services, as well as data handling and transfer services including Internet connectivity.

NISN provides for the improvement, operation and maintenance of NASA network systems and facilities. Telecommunications network systems include digital voice, data and video switching equipment, audio and video conferencing and bridging systems, wide-band multiplexing equipment, and sophisticated network management, monitoring, and fault isolation systems. Equipment and facilities of NASA Select Television are also provided by the NISN.

Telecommunications services are rapidly developing and maturing. With the advancements of telecommunications technology and standards, NASA telecommunications services are now more readily available from commercial sources. NISN continually analyzes current telecommunications requirements to determine the feasibility of providing NASA telecommunications services through commercial sources. NISN also maintains a close relationship with the NASA Research and Education Network (NREN), NASA's research and development, to determine what information technologies are beneficial to support NASA's growing telecommunications needs. As technologies become standard and commercially available, NISN conducts study and cost analyses to determine the feasibility of purchasing these services for use by the NASA community.

SCHEDULE AND OUTPUTS

	FY 1998		FY 1999		FY 2000
	Plan	Actual	Plan	Current	Plan
Number of locations connected	400	398	450	410	420
Number of electronic conferences	31,500	41,000	34,500	45,000	48,000

Constrained travel budgets continue to increase the number of electronic conferences supported within NASA. As more program and administrative services, such as the Consolidated SuperComputer Management and Integrated Financial Management Programs, are consolidated to one center, reliance on the networking services increases. Users no longer have "center" resources, but are accessing consolidated Agency resources across the NISN network. This has resulted in increased network connections.

ACCOMPLISHMENTS AND PLANS

In FY 1998, NISN completed the implementation activities for the commercialization of the Video Teleconferencing Service, the Voice Teleconferencing Service, the Facsimile Broadcast service, and the transmission for mission support routed data services. These services provide support to all NASA programs and Centers.

NISN completed the transition of the NISN Video Teleconferencing Service to the General Services Administration's Federal Telecommunications Services (FTS) 2000 Switched Compressed Video Transmission Service (SCVTS). This video service is shared by several government agencies, provides connectivity to commercial video services such as those provided by Sprint and MCI, and is also compatible to desktop video systems. This transition standardizes NASA video teleconferencing service on the industry standard of voice activated switching, and provides greater access to non-NASA video systems.

NISN established a "meet-me" type voice teleconferencing system, based on a commercially provided service from MCI. This service enhances NISN existing reservation voice teleconferencing service and allows users to participate in voice teleconferences from locations other than their offices and at their convenience.

NISN replaced the existing FaxXchange service, which consisted of dedicated hardware providing broadcast fax distribution, with a commercially provided service from MCI. The MCI service provided for a more reliable service, additional features, and usage based pricing that would not have been available on the FaxXchange service without extensive and costly upgrades.

NISN completed the transition of its transmission infrastructure for mission support routed data services to an Asynchronous Transfer Mode (ATM) infrastructure, provided by FTS2000 Network B vendor- Sprint. NISN has also expanded the use of this network from the originally planned eight locations to ten NASA locations. NISN and NASA Research and Education Network (NREN) continue to share these services, resulting in lower network infrastructure costs for NASA as a whole. In addition to commercialization of the transmission, NISN began several studies to strengthen its peering relationships at common network access points, such as the Chicago Network Access Point (NAP) and the Sprint NAP. These are in addition to existing connectivity to internet exchange points on both the west and east coast. These additional connections have increased NISN's access to other government and education locations. NISN is also participating in the development of the Next Generation Internet Exchange (NGIX) sites in conjunction with the Department of Defense, Department of Energy, and the industry provided Abilene network. This will allow network connectivity to many NASA partners without the installation of dedicated services. These peering relationships will greatly benefit the distribution of the Earth Observing System (EOS) data as well as provide connectivity to many of the ISS principle investigators.

NISN completed the implementation of the Mission IP service. Through the use of conversion devices, the 4800 Bit Block data from spacecraft is converted to the industry standard Internet protocol (IP). This allowed the use of standard network implementation to support mission services. Testing of this service was completed during multiple Space Shuttle Missions and has been accepted by the user community for primary support of NASA missions.

NISN participated in the development of the Guam Remote Ground Terminal (GRGT), which was dedicated in July 1998. NISN provided the network connectivity, to support voice and data services, from White Sands to Guam. Extensive planning and service testing, in conjunction with other responsible areas of the development of the GRGT, was supported.

NISN participated in a team effort to enhance the general Internet connectivity from the South Pole. The South Pole TDRSS Relay (SPTR) System allowed users in the South Pole to augment their commercial internet service, provided through the GOES-3 and LES-9 satellites, with service via NASA's TDRSS satellite. The TDRSS service provided up to two and half hours additional visibility from the South Pole as well as increased network access to accommodate the large imaging data file transfers. NISN provided the network connectivity from White Sands to the general Internet and also ensured proper routing between the two connection methods. The SPTR effort was conducted in partnership with the National Science Foundation and supports the Science and Technology Center for Astrophysical Research in Antarctica (CARA) and the Antarctic Muon and Neutrino Detector Array (AMANDA). CARA and AMANDA provide observatories at the South Pole with instrumentation designed to probe the outer reaches of the universe.

NISN continued its participation in industry forums with presentations on ATM addressing to the Next Generation Internet (NGI)'s Joint Engineering Team, ATM Switched Virtual Channels at the ATM98 Conference, and Quality of Service (QoS) Development at the NREN Workshop. These activities keep NISN in the forefront of technology developments in the industry and across the government agencies. In addition to these activities, NISN also completed the downsizing of the NASA Packet Switching System (NPSS), a legacy X.25 network. Customer applications have been transitioned to other NISN services. The network continues to be used to support management of network resources. NISN has conducted a complete study of all network resources, including commercially provided services to ensure Year 2000 (Y2K) compliance. NISN has developed schedules and implementation plans to complete necessary changes by December 1998. NISN also completed the implementation of additional capacity and services to the Russian telecommunications infrastructure in order to support the Phase II International Space Station requirements. These services included additional video teleconferencing, routed data, and local area connectivity to the Moscow Mission Control Center and the Gagarin Cosmonaut Training Center.

In FY 1999, NISN will complete the necessary changes for the network resources to be Y2K compliant in December 1998. This will support NASA's goal to be Y2K compliant by February 1999. NISN will continue to support the development of the NGIXs, which will increase NISN's ability to provide enhanced-routed data services to NISN customers such as ISS and EOS. NISN will continue to play an active role in technology assessments, focusing on voice over ATM and IP, QoS prototyping, and routing protocol evaluation. NISN will add additional capacity, network connections, and services as necessary to support the initial implementation of the IFMP, and the growth of the ISS and EOS programs. NISN will complete the migration of services to the new Consolidation Space Operations Contract (CSOC) and the Federal Telecommunications Services - 2001 (FTS2001) contracts.

In FY2000, NISN will continue to analyze commercial services for potential use in meeting NASA's expanding Mission Requirements. NASA will be adding services in support continued implementation of IFMP, CoSMO, ISS Phase II, National Oceanic and Atmospheric Administration (NOAA)-K, Earth Observation System, Advanced Composition Explorer (ACE), Advanced Earth Observing Satellite (ADEOS) and TRMM.